

What is claimed is:

1. A microstrip patch antenna having a high gain and wide band, comprising:

5 a first patch antenna layer including a ground surface and a first dielectric layer for radiating a energy supplied from transmitting/receiving feeding circuit and a first radiation patch electrically coupled to the first dielectric layer and supplying the energy to a receiving
10 feeding circuit electrically coupled with the first radiation patch, wherein the energy is supplied by electromagnetic coupling of a first parasitic patch and second parasitic patch;

 a second patch antenna layer including a second
15 dielectric layer and third dielectric layer for improving impedance bandwidth of energy received through the first parasitic patch arranged in between the second dielectric layer and the third dielectric layer and radiating the improved impedance bandwidth; and

20 a third patch antenna layer including a fourth dielectric layer and fifth dielectric layer for improving a gain of the energy received through the second parasitic patch arraigned in between the fourth dielectric layer and the fifth dielectric layer.

25

2. The high gain wide band microstrip patch antenna for transmitting and receiving as recited in claim 1,

wherein the first radiation patch, the first parasitic patch and second parasitic patch are arranged in overlapped manner.

5 3. The high gain wide band microstrip patch antenna for transmitting and receiving, as recite in claim 1, wherein the second dielectric layer and fourth dielectric layer have an electric permittivity as 1.

10 4. The high gain wide band microstrip patch antenna for transmitting and receiving, as recited in claim 1, wherein the transmitting feeding circuit and receiving feeding circuit are orthogonally arranged and electrically coupled to the first radiation patch.

15 5. The high gain wide band microstrip patch antenna for transmitting and receiving, as recited in claim 1, wherein the transmitting feeding circuit and receiving feeding circuit are arranged in the first dielectric layer
20 and directly feeding energy to the first radiation patch separately for receiving and transmitting.

 6. The microstrip patch array antenna, comprising:
 a plurality of microstrip patch antennas being
25 arranged in a $M \times N$ manner and coupled by electrically coupling transmitting feeding circuits of the microstrip patch antennas to a transmitting port and electrically

coupling receiving feeding circuits of the microstrip patch antennas to a receiving port,

wherein the microstrip patch antenna includes:

5 a first patch antenna layer including a ground surface and a first dielectric layer for radiating a energy supplied from transmitting/receiving feeding circuit and a first radiation patch electrically coupled to the first dielectric layer and supplying the energy to a receiving feeding circuit
10 electrically coupled with the first radiation patch, wherein the energy is supplied by electromagnetic coupling of a first parasitic patch and second parasitic patch;

15 a second patch antenna layer including a second dielectric layer and third dielectric layer for improving impedance bandwidth of energy received through the first parasitic patch arranged in between the second dielectric layer and the third dielectric layer and radiating the improved impedance bandwidth;
20 and

a third patch antenna layer including a fourth dielectric layer and fifth dielectric layer for improving a gain of the energy received through the second parasitic patch arraigned in between the
25 fourth dielectric layer and the fifth dielectric layer.

7. The microstrip patch array antenna, as recited in claim 6, wherein first radiation patches of the microstrip patch antennas are arranged in a predetermined gap in a range of 0.9λ to 2λ .

5

8. The microstrip patch array antenna, as recited in claim 6, wherein a plurality of the transmitting feeding circuits and a plurality of the receiving feeding circuits are one of serial/parallel distributing circuit and coupled electric circuit.

10

9. The microstrip patch array antenna, as recited in claim 6, wherein a plurality of the microstrip patch antennas being arranged in a 8×1 manner and coupled by electrically coupling transmitting feeding circuits of the microstrip patch antennas to a transmitting port and electrically coupling receiving feeding circuits of the microstrip patch antennas to a receiving port.

15